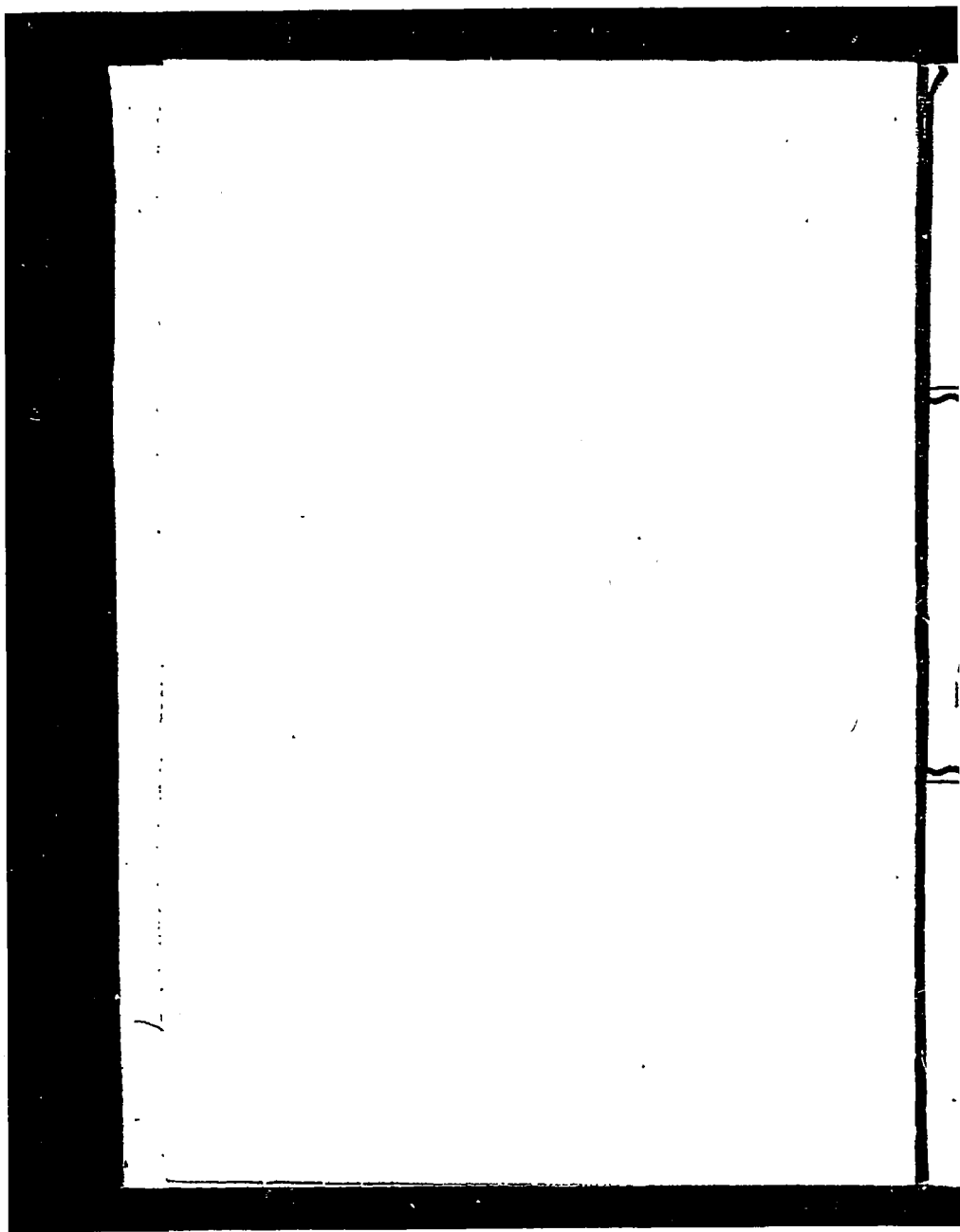


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Public Safety on Highways Under Construction

By W. K. COX

Mgr. of Sales Promotion, Caterpillar Tractor Co., Peoria, Ill.

For the ten years since 1945 we have been setting new records in construction, learning how to provide adequate physical equipment for our growing economy. Through an unprecedented depression and an unprecedented war we have had to "make do," and among the most dynamic factors of the economy has been the undeniable need for bigger and better highways.

It is no longer a question of need. Few of us will question the fact that highway construction approaching the President's \$100.8 billion ten year program is desirable. We will certainly move toward doubling the present rate during the years just ahead.

In 1949, Caterpillar as a company began echoing the cry that so many had taken up following World War II, for an active highway construction program. This Caterpillar program, designed to stimulate active support of the highway programs already planned and awaiting public approval in most states, not only appeared as ads in *Saturday Evening Post*, *Time*, *News Week*, and several publications in Canada, but in the form of motion pictures depicting the dangers of our present highway system, and the dangers increasingly present for the construction men building us new and safer roads.

The first ad appeared in March, 1949, in the *Saturday Evening Post*. It was entitled "Stop Murder at the Crossroads." Its appearance brought an immediate and favorable reaction from the public. The theme of stopping murder with new, safer highways was continued into 1950 and was joined with additional support from all quarters, such as Goodyear Tire and Rubber Co., Portland Cement Association, and the National Truckers Association. Later these were joined by the Ford Motor Company and Firestone.

Since then we have aggressively continued our campaign for better roads. Public and press support has grown tremendously. Newspapers all over the country have pushed projects for better roads locally and regionally, and practically every important general magazine has supported the cause.

Inseparably tied with our continuing effort for an organized road program has been the production of safety and highway films by Caterpillar since 1949. Beginning with the first film presentation, "Highways Ahead," in 1949, we continued to depict the unsafe condition of many of the present day highways in "The Perfect Crime."

With the increase of highway construction in the same period, we emphasized the increasing need for safety on the construction job in "The Gamblers."

Even more closely tied with the need for better highways expressed in our space advertising, is "Road Block," a film that stresses the need for cooperative action by all the people in initiating new highway construction.

Caterpillar's highway ad program correlated with highway safety films was one of the first organized public efforts to create support for better roads on a national basis. We have staged this program consistently and aggressively since 1949.

Our first film on construction safety, "The Gamblers," was partially a result of the requests of our customers who felt a need for more safety education on the construction job. Although not a general interest film, 460 prints of "The Gamblers" have been distributed, and the U. S. Air Force alone now has 40 prints for use as an official training film.

Caterpillar's latest treatment of the highway safety problem is in the film, "The Last Mile." It's a new film, with a warning of a tragically old situation, the mounting toll of death on the highway.

Overcrowded, poorly-maintained highways are killers, true, but when tractors, scrapers, motor graders and trucks begin the job of turning that killer road into a safe, modern highway, the route becomes doubly dangerous, not only for the countless drivers who will thread their way through the construction area, but for the workers on the job as well.

In the early stages of planning this film, we debated on whose safety to place the emphasis. The foremen, flagmen, shovel

men and cat skimmers know of the constant danger on the job and were reminded of it in "The Gamblers." The motorist's responsibility for his life and the lives of others can never be told as often as it was in "The Perfect Crime." This new film places the responsibility squarely where it belongs, with everyone concerned, the man working to make the road safe and the driving public that travels the temporary construction area.

"The Last Mile" would not have been possible without the help of the Associated General Contractors, who supplied us with case histories of the most frequent on-the-job accidents. From these the story was formed.

As a member of the family of earth-moving manufacturers, we have a sincere interest in the safety of the men who operate our products and those who use the highways built with Caterpillar equipment. And, as in the preparation of safety films in the past, we have been joined by those who share our interest. Members of the National Safety Council and the AGC have been of invaluable help.

I want to express my appreciation on behalf of Caterpillar Tractor Co. to Winston Bros. Company and to Mr. William Hawkins in particular for a tremendous assist in the filming of this new safety movie. As safety director and insurance manager of Winston Bros., chairman of the Joint Visual Aids Committee of the AGC, and secretary of the Construction Section of the National Safety Council, Mr. Hawkins gave generously of his time and knowledge in arranging for the use of Winston Bros. project operations for filming.

The film you are about to see is entitled "The Last Mile." When a condemned criminal walks his last mile there is no turning back. The prisoner has no other choice, but the construction worker building new roads and the motorist driving through the construction area do not need to die. A stretch of new highway under construction can be the start of many miles of enjoyable living. What is the answer to eliminating the death traps? A look at Caterpillar's latest contribution to safety education leaves no doubt.

Safety in Steel Erection

By WILLIAM G. RAPP

Asst. to Gen. Mgr. of Production, Bethlehem Steel Co., Bethlehem, Pa.

At one time structural steel erection was classed among the most hazardous occupations. Ten years ago, the National Safety Council rating was 82.7 frequency and 17.4 severity. Last year, these figures were only 25.9 frequency and 4.9 severity.

This reduction has been due to more and more attention to the details which make for safe working. Methods of erection have not changed radically in the past 20 years, but equipment manufacturers have listened more and more to the steel erecting companies, and have followed suggestions to improve cranes, hoists, compressors, and similar equipment with resulting greater efficiency and safety.

In addition, the drive by the various erectors to make the men more safety-conscious is beginning to bear fruit. Safety

Code books are given to the men to teach them safe practices; better safety posters are being displayed by some companies, posters which are more applicable to structural steel erection than those formerly offered by the National Safety Council; improvements have been made in the shape, construction, and material of safety hats. Some companies have even established Safety Incentive Plans for supervisory personnel, to give them a monetary incentive to see that the work is performed safely.

Building Code revisions indicate more attention is being paid to safeguards such as additional protective floors on tier buildings. Structural Iron Worker Unions are setting up Apprentice Training courses aimed not only at teaching the trade, but also teaching how to do it safely.



Erection by Derricks

Shanties. At the start of a job, shanties should be provided for the men to change and store their clothes, as well as for blueprints and paperwork. One type of shanty is a small, completely assembled unit which should have power, such as a crane, available to unload from cars or trucks and reload on completion of the work. Where such power is not available, a knocked-down type is easily handled, the sections being uniform and permitting the assembly of a shanty variable in length, by means of side sections all about four feet wide.

Trailers. A simpler type is the trailer, where a truck-tractor delivers it, unhooks the front end from the "fifth wheel" on the tractor, and then the landing gear holds the front end as the tractor drives off. This type can have electric wiring, desks, chairs, and so forth, already in place when delivered, and is ready for use immediately.

Delivery Ramp. For a good-sized building, a ramp is usually built to permit delivery of derricks, equipment, and later, truckloads of steel, into the excavation. Care must be used to build this ramp with sufficient strength to hold the heavily loaded trucks safely. Cross-lot bracing must be sturdy enough to keep the side walls from caving in and endangering the men.

Anchorages for Guys. To set up the derricks in "the hole," a truck-crane is often used to eliminate the hazards present when the sections of mast and boom are hauled around, to be assembled by hand, and the boom tripped up by falls. Here again, safety must be considered when installing anchors in the foundations or footings, to take the guys from the mast of the derrick. Hairpin anchors can be embedded in the footings, provided the anchors are of sufficient size to take the guy stress and the footing is of sufficient weight to resist the horizontal and vertical guy loads. Split end eye-anchors can be used in rock foundations, making sure the anchors are firmly embedded by grouting them in after installation.

Grillages. In setting the grillages or slabs, some thought must have been given to providing adequate lifting devices and later, leveling devices. Where the pieces are reasonably light, this is no problem.

Loading in Cars. Steel shipped in cars for unloading at the site, or at some distant

delivery point for transfer by truck, must be so safely loaded that men placing slings around the pieces, will not be endangered by rolling or shifting of individual pieces.

Floor Planks. Once the derricks are up and working, care must be used to avoid dislodging shoring holding the side walls of the excavation, and, as the steel progresses upward, to provide adequate planks to cover the working floor. It is better practice to transfer the planks to the upper floor before jumping the derrick unless sufficient planks are provided to cover both the upper and the lower working floors. But in that event, the plank should be in place on the floor to which the derrick is jumping before it jumps. Where insufficient planks are on hand, these should at least be enough for the working floor, and for the areas directly below the riveters, or welders, and bolters.

Where two or more derricks are working at the same time, guys should be so located as to provide the minimum interference between the derricks.

Sidewalk Bridge. When the structure adjoins a busy thoroughfare, a sidewalk bridge of sufficient strength to protect pedestrians should be provided.

Distribution of Steel. On the working floor, steel should be distributed in such a way that there can be little chance of beams rolling over on men working there. Sufficient space must be provided for the bull-stick-man to manipulate the derrick without danger of steel rolling or falling on him.

Connecting. An adequate supply of drift pins and bolts must be provided so that the connectors can connect a member safely before cutting loose. Taglines should be used to guide each piece safely aloft without danger of striking other beams, and also so that the ends of the piece being erected can be swung close enough for the connectors to reach the member safely. The size of slings used should be watched carefully, so that they are of adequate strength to handle the pieces to be erected.

Slings and Hitches. Light pieces can usually be handled by a single sling placed at the center of the piece, but heavy, or deep, girders usually require hitches or a pair of lifting slings, to insure their being more easily, and safely, connected. Where such girders have knife connections, it is always safer to lower them for connecting instead

of lifting them up through the knife connection. If the piece should foul, an excessive pull on the lead line could cause the sling to break and permit the piece to fall, whereas this could not occur if the piece were being connected by lowering into place.

Diagonals. Erection of diagonal members introduces a special hazard in that the sling must be heavy enough to hold the piece but light enough to grip it without sliding upward.

Connectors. Care must be taken in assigning men to connecting, to be sure they are experienced and sure-footed. For although ladders are placed as soon as possible between the working floor and the floor being erected, the connectors still must get from one column to the next over the beams being erected.

Columns. As columns are erected, sufficient bolts and pins must be used to hold them in place against possible wind, and against beams being swung into place for connecting to the columns.

Special Devices. Various special devices are used to aid in safer erection. For example, a column-setting "hickey" is used, whereby the column is picked by means of a pair of slings secured to two shackles sitting over the upper splice plates. A long pin through holes in the splice plates and through the shackles permits the column to be rotated from its horizontal, delivered position, to its vertical position for erection. The column then hangs plumb, whereas with a sling around the shaft, it cannot hang plumb. This scheme thus eliminates one of the hazards in erecting. Once the column is in place and secured, a line to the long pin through the shackles, can be pulled to remove the pin, which thus disengages the shackles from the column and eliminates the need of a man being forced to climb the column to "cut it loose."

Hauling Girders. When girders are hauled upright from the delivery point by trucks, adequate devices must be provided to hold the girder in place in transit, so that the men unloading it are not endangered while installing unloading slings or hitches.

Two Derricks Lifting. Where heavy pieces are being picked by two derricks of unequal capacity, or even by two cranes, the lifting slings should be so located that the distribution of the load gives the rigs loads in proportion to their relative capacities.

Girder Dogs. When girder dogs are used, care must be taken that they are placed so they cannot slip sideways and thus permit the member to become unbalanced and slide out of the dogs.

Relay Derricks. On a tall building with severe set-backs, a relay derrick is set up on a lower floor to transfer the steel from trucks to a point where the erecting derrick can pick the load without overstressing the derrick or the guys.

Jinniwink Dismantling Derrick. Once the derrick has reached the top of the structure, a jinniwink is usually set up to dismantle the derrick and load it out to the street. Care must be taken to lash down the jinniwink slings properly, to take the stresses from handling the various sections of mast and boom of the erecting rig.

Protection Over Hoist. Some form of covering should be provided over the hoist as protection to both the hoisting engineer and the equipment from the weather and from possible falling objects.

Safety Equipment. The men should, of course, be provided with safety hats, and where the work requires it, safety goggles. Men working near welders should have goggles with the proper shade of safety glass as protection from welding flash.

Need of Scaffolds. Where riveters, bolters, or welders can work from a planked floor, this is usually best. If no such floor is available, and the men cannot work safely from the steel itself, adequate floats or needle beam scaffolds must be hung.

Scaffold Lines. Lines for rivet floats and needle beam scaffolds should be of first grade manila of sufficient size to hold men and tools safely, and of sufficient extra size in case a strand is burned by a hot rivet or falling sparks. Where two floats are hung on either side of a beam, it is advisable to tie them together as the man driving and the man bucking up will both tend to cause the floats to separate.

Safe Hitches. The men should be taught safe hitches for the lines around the supporting beams, as well as at the point where the lines are tied to the needle beams. When men are installing bolts and cannot safely operate from the steel itself, whether by hand or by impact wrench, they should have adequate scaffolds, just as riveters or welders.

